REMARKS

Applicants thank the Examiner for the thorough Examination of the application. A substitute Abstract is being submitted with this Amendment. It is believed that no new matter is added to the application by this Amendment.

Status Of The Claims

Claims 1, 5 and 8-19 are pending in the application. Claims 2-4, 6 and 7 are canceled by this Amendment. Claim 1 has been amended to incorporate the subject matter of claim 2-4 and 7.

Election/Restriction

The Examiner has restricted the invention into the following groups:

I. Claims 1-18, drawn to a process; and

II. Claim 19, drawn to a product.

On September 19, 2005, Applicants' representative telephonically elected Group I, claims 1-18 with traverse. This election of Group I with traverse is affirmed.

As set forth in Section 803 of the M.P.E.P., the Examiner must examine an application on the merits if the examination of the entire application can be made without serious burden. Two criteria are identified for proper requirement for restriction:

1. The inventions must be independent or distinct as claimed; and
2. There must be a serious burden on the Examiner if the restriction is not required.

Applicants respectfully submit that a serious burden has not been placed on the Examiner to consider all of the claims in a single application. A review of the subject matter set forth in the claims would have an overlapping search. Thus a different field of search really does not exist with regard to the claims of the present application.

Further, Applicants particularly wish to point out the interrelationship between Group I and Group II. Claim 19 of Group II depends upon claim 1 of Group I. As a result, a finding of allowability of claim 1 of Group I would render claim 19 of Group II instantly allowable. There is thus no burden placed upon the Examiner to examine both Group I and Group II on the merits.

Accordingly, rejoinder and examination of all of the claims of the invention on the merits is respectfully requested.

Objection To The Specification

The Examiner objects to the Abstract as not being a single paragraph. This paper presents a substitute Abstract that is in the form of a single paragraph.

Rejections Over Ota

Claims 1-7 and 16-18 are rejected under 35 USC § 102(e) as being anticipated by Ota (U.S Patent 6,411,636). Claims 8-15 are rejected under 35 USC § 103(a) as being obvious over the single reference of Ota. Applicants respectfully traverse.

The present invention pertains to a method of fabricating a cleaved facet of a laser device. In one of the many embodiments of the invention, such as is set forth in claim 1, the device has a substrate with a thickness of between 350 μm and 400 μm formed of c-plane sapphire and at least one GaN-based layer formed upon a first surface of the substrate. Claim 1 of the present invention also sets forth that the method may include the following steps: cutting linear grooves into a second surface of the substrate, said grooves being in alignment with vertical planes of said substrate, the vertical planes being selected from at least one of m-planes (1100) or a-planes (1120); and cleaving said substrate and said at least one GaN-based layer along said vertical planes; wherein said cutting is effected by a laser beam from an external laser source.

Ota pertains to a nitride semiconductor laser and a method of fabricating the same. With respect to the present invention, Ota duscusses a method of cleaving a nitride/substrate layer system where a light beam is applied from the substrate side toward the interface between the substrate and the crystal layer, thereby forming the decomposed matter area of a nitride semiconductor (see for example col. 3, lines 1-17).

In contrast, the present invention is directed to a combination of method steps wherein a laser is used for cutting linear grooves. Additionally, applicants note that there is also no teaching or suggestion in Oka pertaining to fabricating a cleaved face of a laser device wherein the substrate has a thickness of between 350 μm and 400 μm (claim 1 of the present invention). There are therefore fundamental differences between Ota and the present invention.

The present invention is thus clearly not anticipated by Ota.

Further, Ota explicitly requires that a light beam be applied from the substrate side toward the interface between the substrate and the crystal layer such that a decomposed matter area of a nitride semiconductor is formed. This concept is entirely different from the present invention, which is directed to a combination of method steps wherein a laser is used for cutting linear grooves into a second surface of the substrate and cleaning the substrate. Accordingly, it cannot be seen how the person skilled in the art can arrive at the present invention starting from the disclosure of Ota. On the contrary, the teaching of Ota requiring the partial decomposition of the semiconductor layer teaches away from the present invention.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). A *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997).

Yet further, the Examiner at page 6, lines 3-5 of the Office Action admits to the failures of Ota: "Ota et al....remain silent regarding the specific power range and density of the laser beam applied during the cutting or groove-forming step." The Examiner then asserts that it would be obvious to optimize laser ablation parameters as being a result effective variable (Office Action at page 6, lines11-14). However, the Examiner is using the single reference of Ota to allege obviousness.

To establish a *prima facie* case of obviousness, "the prior art reference (or references when combined) must teach or suggest all the claim limitations." *MPEP §2143*. In addition, if a reference needs to be modified to achieve the claimed invention "there must be a showing of a suggestion or motivation to modify the teachings of that reference to the claimed invention in order to support the obviousness conclusion." *Sibia Neurosciences Inc. v. Cadus Pharmaceutical Corp.*, 225 F.3d 1349, 55 USPQ2d 1927 (Fed. Cir. 2000).

In this case, the Examiner fails to point out where in the single reference of Ota itself resides the teaching or suggestion to produce the parameters set forth in claim 8-15. At most, the Examiner points to Ota at column 9, lines 1-3, which states: "micron-

order curvature governs cleavability." However, this statement falls short of suggesting, e.g., the 40 μm to 100 μm groove depth of claim 15.

Therefore, Ota fails to anticipate claim 1 of the present invention. Claims depending upon claim 1 are patentable for at least the above reasons. Ota additionally would fail to motivate one having ordinary skill in the art to produce the invention of claims 8-15. A *prima facie* case of obviousness has thus not been made. These rejections are overcome and withdrawal thereof is respectfully requested.

Rejection Over Cervantes

Claims 1-6 and 16-18 are rejected under 35 USC § 102(e) as being anticipated by Cervantes (U.S. Patent 6,379,985). Applicants traverse.

Cervantes pertains to methods for cleaving facets in III-V nitrides grown on c-face sapphire substrates. Cervantes at column 2, lines 38-45 states:

> An exemplary embodiment of the methods for cleaving facets for III-V nitride films according to this invention comprises forming a semiconductor structure comprising at least one III-V nitride layer on the top c-face of a c-face sapphire substrate, which also includes a bottom c-face. A line of weakness is formed on the bottom c-face of the c-face sapphire substrate. The line of weakness extends in the a-plane direction of the c-face sapphire substrate.

When compared to instant claim 1 of the present invention, the line of weakness in Cervantes would appear to correspond to the "linear grooves ... said grooves being in alignment with vertical planes of said substrate" of claim 1 of the present invention.

Also, the combination of method steps relating to the "GaN-based layer" and "cutting is effected by a laser beam" of claim 1 are not disclosed in the aforementioned paragraph of Cervantes. Please note, however, the following disclosure in Cervantes: "The III-V nitrides comprise group III and group V elements of the periodic table. The III-V nitrides can be binary compounds, such as GaN, AlN or InN." (Cervantes at col. 3, lines 39-41).

Additionally, Cervantes at column 5, lines 1-8 states:

> Another suitable technique for weakening the bottom c-face 66 of the c-face sapphire substrate 60 in the a-plane direction is laser ablation. Laser ablation can remove material along the a-plane direction to form lines of weakness, along which the c-face sapphire substrate can be cleaved. Short-wavelength, pulsed excimer lasers.. emit an optical beam that can be focused to a small spot size.

Further, Cervantes at column 5, lines 11-17 states:

> As the laser pulses are very short (few tens of ns), the heating occurs only locally and does not affect the zone surrounding the ablated region. ... To form a narrow groove or trench the laser is focused to a very small spot size, typically in the order of a few microns.

Further, Cervantes at column 5, lines 23-25 states: "The depth of the trench or groove is typically in the order of several microns or several tens of microns." Cervantes at column 3, lines 66-67 also states: "The c-face sapphire substrate 60 typically has a thickness of from about 100 μm to about 200 μm."

It is thus clear that the lines of weakness of Cervantes exist only in the substrate layer and do not extend to the GaN-based layer. That is, Cervantes uses a short

wavelength, pulsed excimer laser to initiate the cutting process in the sapphire, the trench depths are a few microns or tens of microns and the sapphire thickness is about 100-200 μm.

In contrast, the present invention does not consider sapphire samples of 100-200 μm thickness (this is usually achieved by lapping/thinning the substrate). Instead, the present invention starts with a sapphire substrate as may be typically obtained from vendors, which is usually about 350-400 μm thick (see claim 1 of the present invention).

Using thick samples avoids a process step, which is lapping (which is tough and expensive with sapphire material). Also, it is not clear from Cervantes as to how, after the laser cutting of the sapphire and the formation of "lines of weakness" in the sapphire, how the cutting of the GaN layer initiated. In the present invention, it is clear that it is through cleaving.

Therefore, Cervantes fails to disclose or suggest each and every method step of claim 1 of the present invention, used together with a certain substrate thickness. Cervantes thus clearly fails to anticipate the present invention. Claims depending on claim 1 are patentable for at least the above reasons. This rejection is overcome and withdrawal thereof is respectfully requested.

Information Disclosure Statements

The Examiner is thanked for considering the Information Disclosure Statement filed June 25, 2003 and for making the initialed PTO-1449 forms of record in the application in the Office Action mailed September 14, 2005. The Examiner is thanked for considering the Information Disclosure Statement filed May 9, 2005 and for making the initialed PTO/SB/08 form of record in the application in the Office Action mailed September 14, 2005.

Foreign Priority

The Examiner has acknowledged foreign priority and indicated that a certified copy of the priority document has been received in the Office Action mailed September 14, 2005.

The Drawings

The Examiner has indicated that the drawing figures are acceptable in the Office Action mailed September 14, 2005.

Conclusion

All objections and/or rejections have been successfully traversed, obviated or rendered moot. No issues remain. The Examiner is therefore respectfully requested to allow the application.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert E. Goozner, Ph.D. (Reg. No. 42,593) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicants respectfully petition for a three (3) month extension of time for filing a reply in connection with the present application, and the required fee of $1020.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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